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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,234	07/15/2003	Lie Shi	2000.120	1196
29494	7590	11/18/2005	EXAMINER	
ROBERT H. HAMMER III, P.C. 3125 SPRINGBANK LANE SUITE G CHARLOTTE, NC 28226			KALAFUT, STEPHEN J	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/621,234	SHI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Stephen J. Kalafut	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 16 and 17 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>22 September 2003</u> . | 6) <input type="checkbox"/> Other: ____  |

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Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The terms "high temperature" and "low temperature" in claim 1 are relative terms which renders the claim indefinite. The terms "high" and "low" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Claims 2-13 depend from claim 1 and would likewise also be indefinite. Claim 2 is confusing because it recites that the adhesive "further comprises" a swellable polymer, but the term "comprises" is not previously used, which would be implied by the word "further".

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 7-9 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Zucker (US 6,852,444).

Zucker discloses a battery separator that includes a fibrous layer, preferably of a glass fleece (column 4, lines 31-38), which would be non-woven, and a microporous thermoplastic polymer layer (column 6, lines 14-25), such as polyvinyl chloride (column 5, lines 30-35) or polyacetal (column 7, lines 40-42). The two layers may be bonded by an adhesive such as an

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acrylate (column 9 line 64 through column 10, line 4), which would be to some extent swellable, because it is chemically similar to some of those presently recited. The glass used as the fibrous layer would be a type of ceramic, and would have a higher melting point than the polymer of the microporous layer, thus meeting the recitations of "high temperature" and "low temperature" in claim 1, to the extent that they are understood.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 7, 13, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi (US 6,475,666) in view of Adamson (EP 262,179).

Takeuchi discloses a two-layer shutdown separator including a layer of non-woven material with a melting point at least 10 °C higher than the adjacent microporous film (column 3, lines 8-22). The film is made of polyethylene or other suitable material (column 6, lines 35-40). The separator is made by forming the two layers and then laminating them together (column 7, lines 8-12). These claims differ by reciting that an adhesive is used to bind the two layers together, the adhesive being swellable and applied by coating from a solution thereof.

Adamson discloses an adhesive for use in multilayer battery separators, comprising polyacrylic acids applied via a solvent to the lamina to be adhered (page 2, lines 26-65). These polymers are able to gel (page 2, line 44). Because the adhesive composition of Adamson has improved

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viscosity and flow characteristics, without impairing electrochemical and wetting properties (page 3, lines 25-31), it would be obvious to use the adhesive of Adamson to adhere the two layers of the separator of Takeuchi.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zucker.

Zucker does not disclose any of the specific polymers recited in this claim, but does teach “an acrylate” as one type of adhesive (column 9, lines 66-67). Selection among the variously known types of acrylate polymers would be within the skill of the artisan. Thus, this claim would be obvious over Zucker.

Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zucker in view of Adamson.

While discloses the use of adhesives to bind the two layers of his separator (column 9, line 64 through column 10, line 4) he does not disclose the use of a solution to apply the adhesive. Adamson discloses the use of solvents to apply his adhesive, either in solution or dispersion (page 2, lines 43-55). This would enable the adhesive to be applied without using heat, and would improve its viscosity and flow characteristics (page 3, lines 25-31). For these reasons, it would be obvious to use the adhesive of Adamson to adhere the two layers of the separator of Zucker.

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Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Zucker or Takeuchi, each in view of Adamson, as applied to claims 14 and 16 above, and further in view of Hoshina *et al.* (US 6,235,430).

The above references do not disclose the step of washing during the process of making their separators. Hoshina *et al.* disclose a separator that is washed, as a final step in its manufacture (column 57-61). Because this would help to remove any impurities or residual solvents, it would be obvious to wash the separators of either Zucker or Takeuchi, after they are laminated with the adhesive of Adamson.

Claims 4-6 and 10-12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. The prior art does not disclose a separator comprising a non-woven flat sheet, a microporous membrane and an adhesive between these layers, where the adhesive includes a swellable polymer and a wetting agent, or the flat sheet includes a coating or surface treatment.

Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. This claim also recites that the adhesive includes a swellable polymer and a wetting agent.

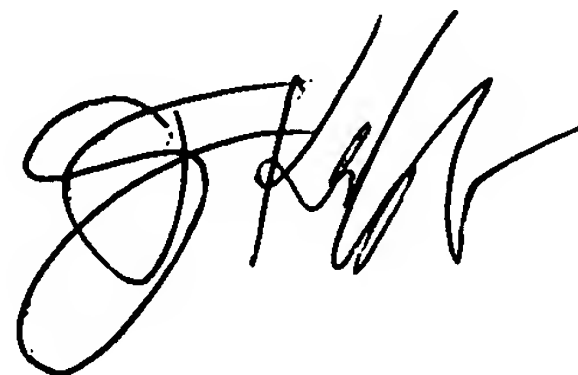
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shinohara *et al.* (US 2002/0055036 or JP 2002-190,291), Treger (US 5,091,272) and Pavlov *et al.* (US 6,509,118) disclose various battery separators.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 571-272-1286. The examiner can normally be reached on Mon-Fri 8:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sjk



STEPHEN J. KALAFUT  
PRIMARY EXAMINER  
GROUP

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